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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,770	11/12/2003	Ryoichi Nagayoshi	10873.1355US01	7405
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HAMRE, SCHUMANN, MUELLER & LARSON P.C. P.O. BOX 2902-0902 MINNEAPOLIS, MN 55402			EXAMINER DURNFORD GESZVAIN, DILLON	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/712,770	Applicant(s) NAGAYOSHI ET AL.	
	Examiner Dillon Durnford-Geszvain	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-16, 18-24, 29-32 and 36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-16, 29-32 and 36 is/are rejected.
- 7) ☒ Claim(s) 18-24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>6/28/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Claims 3-16, 18-24, 29-32 and 36 are pending, claims 3, 6, 15, 24, 29, claims 1, 2, 17, 25-28, 33-35, 37 and 38 are cancelled.

Response to Arguments

2. Applicant's arguments filed 9/27/2007 have been fully considered but they are not persuasive.

Regarding claim 3 the applicant argues that Ikeda does not teach that each photoelectric converter is composed of $2n+1$ charge and arranged in a horizontal direction as required by the claim. However, the claim nowhere requires that every photoelectric converter be composed of $2n+1$ charge. The claim requires that each pixel mixture group be composed of the charge from $2n+1$ pixels (see currently amended claim 3) and the claim does not require any particular arrangement of pixels other than that they be bi-directionally arranged. Furthermore, as Ikeda was only relied on to show combining more than 2 pixels in a pixel mixture group the Applicant's arguments seem to be attacking the structure of Ikeda which was not relied on in making the rejection. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The Applicant argues that there is no motivation to modify the features of Ikeda

to claim 3, the Examiner is unsure what the Applicant intends to allege by stating this. However, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation comes from Ikeda (see Column 16 lines 19-22 and the rejection of claim 3 in the previous Office Action).

Next the Applicant alleges that Ikeda uses charge proportions of y_{n+7} to y_n arranged in a vertical direction to increase the readout period at which signal charges are read out from the vertical transfer part. The Examiner is unsure what the applicant is referring to when they state that Ikeda uses charge proportions of y_{n+7} to y_n . The Examiner would like to point out that Fig. 16 represents a part of an imager and not the entirety of an imager as the Applicant seems to be alleging.

In response to applicant's argument that Ikeda does not contemplate preventing moiré or aliasing and therefore is not combinable with Iizuka, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter.

1985).

3. Regarding claim 29, the Applicant makes the same types of arguments as applied to claim 3. As stated above, Ikeda was relied on only to teach modes of mixing different amounts of pixels and not the architecture used to read out the pixels nor the arrangement of the pixels being combined. This was taught by Iizuka. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims **3-12, 14-16, 29-32** and **36** are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,686,960 (Iizuka) in view of US 6,423,959 (Ikeda et al.).

As to claim **3**, Iizuka teaches a solid-state image sensing device¹ (see Fig. 4), comprising:

vertical transfer parts 4 provided corresponding to respective columns of bidimensionally arranged pixels 2 to vertically transfer signal charges read out from the pixels; and

a horizontal transfer part 7 for horizontally transferring the signal charges received from the vertical transfer parts,

wherein the vertical transfer parts include transfer stages, those located closest to the horizontal transfer part being vertical last stages (the part of 4 over the transfer gates 6 is the vertical last stages, see Column 8 lines 34-38), and the vertical last stages have transfer electrodes formed to have identical configurations repeated every m (m denotes an integer of 2 or higher) columns (see Figs. 8 and 9), and

vertical last stages of columns other than one of the m columns or all vertical last stages of the m columns each are provided with a transfer electrode that is independent of those of other vertical last stages of the m columns so that an operation of transferring signal charges from the vertical last stages concerned to the horizontal transfer part is controlled independently of said other vertical last stages (Column 8 lines 24-46),

the integer m is $2n+1$ (n denotes an integer of 1 or higher) (see Figs. 8 and 9 and

note that m is 3),

wherein signal charges of pixels included in each of first and second pixel mixture groups are added together in the horizontal transfer part (see Fig. 6 and Column 9 lines 12-16),

where the first pixel mixture groups each are composed of two pixels arranged at every other pixel in a horizontal direction (G11 and G13 of Fig. 6), and

the second pixel mixture groups each are composed of 2 pixels that are arranged at every other pixel and are pixels other than those of the first pixel mixture groups (R14 and R16 of Fig. 6), with centers of gravity of the pixels of the respective second pixel mixture groups each being located at an equal distance from centers of gravity of the pixels of two first pixel mixture groups adjacent thereto (see Fig. 6 and note that this is just a sample of the imager and it goes on to include columns 7 and higher).

Iizuka further teaches that more than three odd numbered pixels may be added (Column 6 line 67 to Column 7 line 1 or Column 21 lines 14-17, for example).

What Iizuka does not explicitly teach is that the first and second pixel mixture groups contain specifically $2n + 1$ pixels, where n is an integer greater than or equal to one. However, Ikeda et al. teaches adding pixels together with groups consisting of $2n + 1$ pixels (see Fig. 16). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have enlarged the blocks of Iizuka so that they would include $2n + 1$ pixels, such as is done by Ikeda et al. as this would allow for a higher frame rate than what Iizuka which would facilitate high speed capture (see Column 16 lines 19-22).

Note that in this combination the blocks depicted in Fig. 6 of Iizuka would simply be extended to 5 pixels instead of 3.

As to claim 4, see the rejection of claim 3 and note that Iizuka in view of Ikeda et al. further teaches the solid-state image sensing device according to claim 3, wherein with respect to each of the first and second pixel mixture groups present in the vertical last stages,

(a1) only signal charges of pixels located furthest from an output side of the horizontal transfer part in the respective pixel mixture groups each composed of the $2n+1$ pixels are transferred from the vertical last stages to the horizontal transfer part (see Fig. 14B of Iizuka, for example),

(a2) the signal charges present in the horizontal transfer part are transferred in a forward direction by a distance corresponding to two pixels (see Fig. 14C of Iizuka),

(a3) only signal charges of pixels that have signal charges remaining in the vertical last stages and are located furthest from the output side of the horizontal transfer part in the respective pixel mixture groups each composed of the $2n+1$ pixels are transferred from the vertical last stages to the horizontal transfer part (see Fig. 14D of Iizuka), and

(a4) transfer operations a2 and a3 are repeated until all signal charges of the pixel mixture groups each composed of $2n+1$ pixels are transferred from the vertical last stages to the horizontal transfer part (see Fig. 14D).

As to claim 5, see the rejection of claim 4 and note that Iizuka in view of Ikeda et al. further teaches the solid-state image sensing device according to claim 4, wherein further

(b1) as the last operation of transfer operations a1 to a4, signal charges present in the vertical transfer parts of all the columns are transferred to respective next stages after or at the same time a signal charge of the last pixel included in each of the pixel mixture groups each composed of $2n+1$ pixels is transferred from the vertical last stage to the horizontal transfer part (see Fig. 15F of Iizuka),

(b2) with respect to signal charges transferred to the vertical last stages by transfer operation b1, the transfer operations a1 to a4 are carried out (see Figs. 15G and 15H), and

(b3) transfer operations b1 and b2 are repeated until signal charges included in $2n+1$ stages are transferred to the horizontal transfer part (see Fig. 15H).

As to claim 6, see the rejection of claim 3 and note that Iizuka further teaches the solid-state image sensing device according to claim 3, wherein the vertical last stages located closest to the horizontal transfer part of the vertical transfer parts have transfer electrodes formed to have identical configurations repeated every three columns, and

vertical last stages of at least the second and third columns of the three columns, counted as from an output side of the horizontal transfer part, each are provided with a transfer electrode that is independent of those of the other vertical last stages so that an operation of transferring signal charges from the respective vertical last stages

concerned to the horizontal transfer part is controlled independently of the other vertical last stages (see Figs. 8 and 9).

As to claim 7, see the rejection of claim 6 and note that Iizuka et al. further teaches the solid-state image sensing device according to claim 6, wherein a vertical last stage of the first column counted as from the output side of the horizontal transfer part has an electrode configuration that is identical to those of stages other than the vertical last stage of the first column (see Figs. 8 and 9).

As to claim 8, see the rejection of claim 6 and note that claim 8 corresponds to claim 3 but specifies that $n = 1$. Therefore, claim 8 is rejected on the same grounds as claim 3 but with $n = 1$.

Claim 9 depends from claim 6 and roughly corresponds to claim 4 with $n = 1$ and therefore, claim 9 is rejected on the same grounds as claim 4 but with $n = 1$.

Claim 10 depends from claim 9 and roughly corresponds to claim 5 with $n = 1$ and therefore, claim 10 is rejected on the same grounds as claim 5 but with $n = 1$.

As to claim 11, see the rejection of claim 3 and note that Iizuka teaches reading out a 3X3 box and adding the pixels (see Fig. 16). Note that if Iizuka were combined with Ikeda et al. as in claim 3 this would be a 5X5 box and 9 pixels would be read out.

As to claim **12**, see the rejection of claim **11** and note that Iizuka in view of Ikeda et al. would further teach the solid-state image sensing device according to claim **11**, wherein the one pixel mixture group is composed of nine pixels arranged in three rows located at every other row in the vertical direction, with three pixels arranged at every other pixel in the horizontal direction being included in each of the three rows (see Fig. 16 of Iizuka and note that it would contain 9 pixels if extrapolated to a 5X5 box as discussed in claim **11**).

As to claim **14**, see the rejection of claim **3** and note that Iizuka in view of Ikeda et al. would further teach the solid-state image sensing device according to claim **3**, wherein one pixel mixture group is composed of three pixels arranged at every other pixel in the horizontal direction in each of rows located at every three rows in the vertical direction (note that the pixel groups are already taught as containing three pixels arranged at every other pixel and there are pixel mixing groups located every third row in a 5X5 box).

As claim **15**, see the rejection of claim **3** and note that Iizuka further teaches the solid-state image sensing device according to claim **3**, wherein the bidimensionally arranged pixels are provided with color filters arranged so that four pixels of (two pixels arranged horizontally).times.(two pixels arranged vertically) form one unit (see Fig. 4).

As to claim **16**, see the rejection of claim **15** and note that Iizuka further teaches the solid-state image sensing device according to claim **15**, wherein the color filters are arranged so that a first color filter (green) is provided for two pixels, of the four pixels, located on one diagonal line, and second and third color filters (blue and red) are provided for the other two pixels, respectively (see Fig. 4).

As to claim **29**, Iizuka teaches a solid-state image sensing device¹ (see Fig. 4), comprising:

vertical transfer parts 4 provided corresponding to respective columns of bidimensionally arranged pixels 2 to vertically transfer signal charges read out from the pixels; and

a horizontal transfer part 7 for horizontally transferring the signal charges received from the vertical transfer parts,

wherein the vertical transfer parts include transfer stages, those located closest to the horizontal transfer part being vertical last stages (the part of 4 over the transfer gates 6 is the vertical last stages, see Column 8 lines 34-38), and the vertical last stages have transfer electrodes formed to have identical configurations repeated every m (m denotes an integer of 2 or higher) columns (see Figs. 8 and 9), and

vertical last stages of columns other than one of the m columns or all vertical last stages of the m columns each are provided with a transfer electrode that is independent of those of other vertical last stages of the m columns so that an operation of transferring signal charges from the vertical last stages concerned to the horizontal

transfer part is controlled independently of said other vertical last stages (Column 8 lines 24-46).

lizuka further teaches that more than three odd numbered pixels may be added (Column 6 line 67 to Column 7 line 1 or Column 21 lines 14-17, for example), it does not teach that the mode can be switched between the number of pixels to be added.

However, Ikeda teaches three different modes for reading out in movie mode (see Figs. 12-14) where 2, 3 or 4 pixels are mixed. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added at least modes such as those taught by Ikeda et al. to the invention of lizuka as this would allow for the quantity of light to be effectively increased for performing previewing (Column 15 lines 66-67 of Ikeda et al.).

As to claim 30, see the rejection of claim 29 and note that lizuka in view of Ikeda et al. further teaches the solid-state image sensing device according to claim 29, further comprising color filters of three colors (red green and blue) arranged in a repeated pattern in which among the color filters, those of two out of the three colors are arranged vertically and those of two out of the three colors are arranged horizontally (see Fig. 4 of lizuka), wherein the operation mode can be switched selectively between at least two modes including a mode of mixing m_1 pixels arranged horizontally and a mode of mixing m_2 pixels arranged horizontally, with the m_1 pixels and m_2 pixels being provided with filters having one of the three colors of the color filters, respectively (see Column 6 line 67 to Column 7 line 1 or Column 21 lines 14-17, for example).

As to claim **31**, see the rejection of claim **29** and note that Iizuka in view of Ikeda et al. further teaches the solid-state image sensing device according to claim **29**, further comprising color filters of three colors (red green and blue) arranged in a repeated pattern in which among the color filters, those of two out of the three colors are arranged vertically and those of two out of the three colors are arranged horizontally (see Fig. 4 of Iizuka), wherein the operation mode can be switched selectively between at least two modes selected from a mode of mixing two pixels arranged horizontally, a mode of mixing three pixels arranged horizontally, and a mode of mixing four pixels arranged horizontally, with the two, three, and four pixels being provided with filters having one of the three colors of the color filters, respectively (see the rejection of claim **29** and note that the mixing as is done in Iizuka is done horizontally and thus when combined with Ikeda et al. the mixing of 2, 3 or 4 pixels would be done horizontally).

As to claim **32**, see the rejection of claim **29** and note that Iizuka teaches a mode of mixing no pixels (Column 8 lines 24-26).

As to independent claim **36**, see the rejection of claim **3** and note that Iizuka in view of Ikeda further teaches a camera, comprising a solid-state image sensing device according to claim **3** (see Fig. 23 of Ikeda).

7. Claim **13** is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,686,960 (Iizuka) in view of US 6,423,959 (Ikeda et al.) further in view of US 7,199,826 (Uya).

As to claim **13**, see the rejection of claim **3** and note that what neither Iizuka nor Ikeda et al. teach is mixing six pixels in two rows, where three rows are skipped between the two read rows. However, Iizuka in view of Ikeda et al. teaches reading three pixels in a row. Further, Uya teaches a method of mixing pixels where three rows are skipped in-between read rows. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have mixed two of the rows of Iizuka in view of Ikeda et al. resulting in the mixing of six pixels and to have separated the read-out rows by three rows as this would result in an image with six times the sensitivity of an ordinary image that can be read out faster than an ordinary image (see, for example, Column 15 lines 63-67 of Ikeda et al.).

Allowable Subject Matter

8. Claims **18-24** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: as to claims **18-24**, see the previous Office Action.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dillon Durnford-Geszvain whose telephone number is (571) 272-2829. The examiner can normally be reached on Monday through Friday 8 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lin Ye can be reached on (571) 272-7372. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Dillon Durnford-Geszvain

12/10/2007


TUAN HO
PRIMARY EXAMINER